MICHIGAN State FACE Program
Fatality Assessment & Control Evaluation

Michigan State University
Department of Medicine • Occupational and Environmental Medicine
909 Fee Road, 117 West Fee Hall • East Lansing, MI 48824 • 1-517-353-1846 • https://oem.msu.edu

REPORT#: 18MI213 **REPORT DATE:** 6/24/20

Farmer Pinned by Tree Limb When Tree Shifted While Limbing/Bucking Tree

INCIDENT HIGHLIGHTS

DATE:
Late Winter 2018

TIME:
Late morning/early afternoon

VICTIM:
Farmer in his 80s

INDUSTRY/NAICS CODE:
Agriculture/11

EMPLOYER:
Self-employed farmer

SAFETY & TRAINING:
Life Experience

SCENE:
Farm field tree line

LOCATION:
Michigan

EVENT TYPE:
Struck By

SUMMARY

In late winter 2018, a male farmer in his 80s died when a tree he was limbing and bucking with a chain saw shifted, pinning him under the tree's trunk. The tree crown, and most smaller limbs and branches had been removed; only the larger limbs remained. The felled tree had a major branch off the trunk shaped like a "Y". The tree was balancing on one of the "Y" branches and the stump/exposed tree root (flare). The decedent was working alone. It appears the tree shifted and rolled while he was cutting a limb. The tree trunk struck and pinned him against the ground. When he did not return home as planned, his wife called him on his cell phone. She looked for him, and when unsuccessful, called her son…. READ THE FULL REPORT> (p.3)

CONTRIBUTING FACTORS

Key contributing factors identified in this investigation include:
Inadequate hazard assessment of the hazards posed by the felled tree

- Forest floor soil characteristics react differently than field hard packed soils
- Forest edge trees react differently than in-forest trees

LEARN MORE> (p.8)

RECOMMENDATIONS

MIFACE investigators concluded that, to help prevent similar occurrences, employers should:
Use safe work practices when using a chain saw to perform limbing or bucking including performing a hazard assessment, standing uphill when possible, not working alone and wearing appropriate personal protective equipment.

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Michigan Fatality Assessment and Control Evaluation (FACE) Program

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SUMMARY

In late winter 2018, a male farmer in his 80s died when a tree he was limbing and bucking with a chain saw shifted, pinning him under the tree's trunk. The tree crown, smaller limbs and branches had been removed; only the larger limbs remained. The felled tree had a major branch off the trunk shaped like a "Y". The tree was balancing on one of the "Y" branches and the stump/exposed tree root (flare). The decedent was working alone. He was using his chain saw to remove the larger limbs from one of the "Y" branches. During this activity, it appears the tree shifted and rolled. The tree trunk struck and pinned him against the ground. When he did not return home as planned, his wife called him on his cell phone. She looked for him, and when unsuccessful, called her son. Her son arrived at the incident site and, using a chain saw, cut away a section of tree lying on the decedent. Emergency response was summoned. He was declared dead at the scene.

INTRODUCTION

In late winter 2018, a male farmer in his 80s was pinned by a tree trunk when the felled tree shifted during limbing and bucking. MIFACE learned of this incident from an obituary. MIFACE personnel contacted the decedent's daughter who agreed to be interviewed. During the interview, MIFACE also spoke with the decedent's spouse. The decedent's daughter accompanied the MIFACE researcher to the site where the incident took place. MIFACE reviewed the death certificate, police and medical examiner reports during the writing of this report. Pictures used in the report are courtesy of the responding police department, the decedent's family and ones taken during the site visit by the MIFACE investigator. MIFACE has removed identifying information from the photographs.

EMPLOYERS

The decedent's grandfather bought the farm in the early 1900s. The farm was owned by his deceased father's wife. All of the family pitched in on occasion to perform farm activities, but the primary workers were the decedent and his son.

WRITTEN SAFETY PROGRAMS and TRAINING

The farm operation did not have a written farm health and safety plan. To his family member's knowledge, the decedent had not attended farm safety meetings. He provided instruction when family worked with him. The family member provided an example of the type of training provided: "if I got caught up in PTO, turn off the machine here". Safety would routinely be a topic of conversation when his family members assisted in the farm operations.

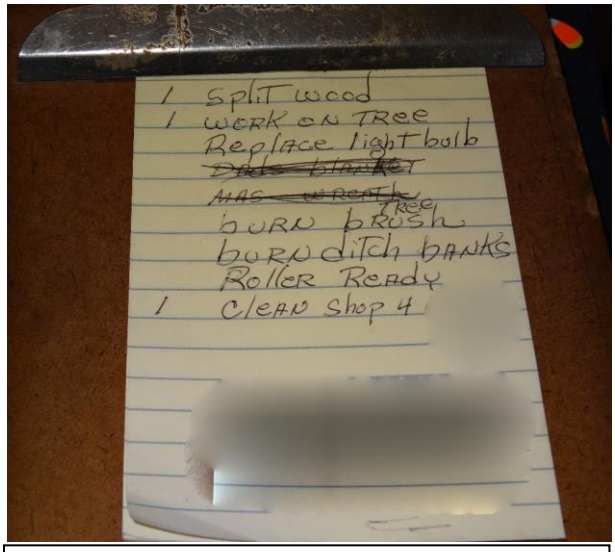


Photo 1. Decedent's chore list

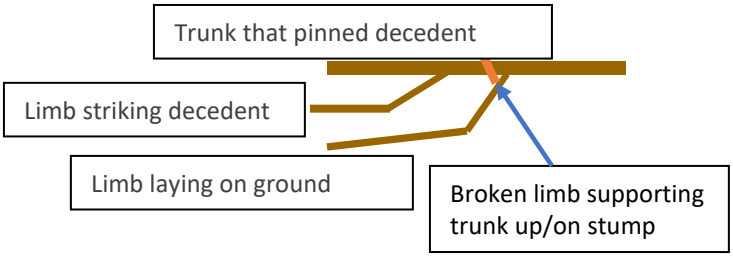
WORKER INFORMATION

The decedent had been farming his entire life in addition to outside employment, such as working at his father's car dealership, as an auto parts manager for another car dealership, and as a volunteer fire fighter. After retirement from the last car dealership, he worked part time (Monday-Wednesday) for an automobile parts supplier delivering auto parts to supplement the farm income. The decedent's work schedule was flexible; he was able to take time off

for planting, harvesting or other farm activities requiring an extended time away from work (for example, he had taken the previous month off to plant corn). His normal workday delivering parts was 8am-5pm

Photo 2. Incident scene, looking south. Solid yellow line is primary trunk of tree. Dotted yellow line is limb striking decedent. Red dotted line is limb that was laying on the ground. Orange dotted line is supporting limb. Trunk and other limb were oriented above the limb laying on the ground.

The decedent was described by family members as very organized, driven, and meticulous. As an example of his organization, he had written a list of "things to do" and had identified chores to be completed prior to a major holiday with a "1" in front of the chore (Photo 1). As can be seen from the chore list, "work on tree" was to be completed.



Drawing 1. Looking south, diagram representation of tree

The decedent's son worked full time on the midnight shift and slept when he returned home. He would not get to the farm until mid-afternoon. Due to his father's driven nature, his father would routinely begin the items on his chore list without his son present.

The decedent was very familiar with using a chainsaw to clear trees. Over the years, the decedent had cleared many acres of woods with a chain saw.

INCIDENT SCENE

The 60-acre farm was surrounded by woods.

The decedent alternated corn one year, and soybeans the next year. The incident occurred on the northwest area of the acreage. A mowed path for equipment travel was present on each side of the field between the field and the woods. On the southwest side of the field, within the woods was a cleared area for processing downed and cut trees.

The species of tree was unknown. The tree branches were striking the combine as it harvested the corn during the harvest the previous year. His son wanted to just cut down the branches striking the combine, but the decedent wanted to cut down the entire tree (Photos 2 and 3).

The entire tree was felled one month prior to the incident. The family members described the tree trunk as being "hung up" on the south side of the stump; the north side of the felled tree was on/up on the southeast side of the stump's root collar/flare and perhaps on the cut face of the stump. The trunk had two large limbs remaining for removal that were oriented above the ground and over the limb on the ground; it is postulated that the decedent was in the process of removing these raised limbs when the incident occurred.

When MIFACE visited the incident site, the site was overgrown with weeds and foliage and measurements were difficult to obtain. The approximate measurements were:

- Limb diameter where he was struck: 23-24"
- Limb area cut from him: ranged from 20 inches down to 11 inches diameter
- Stump diameter: 33 inches
- Stump Notch: 10 inches

WEATHER

A nearby weather station recorded the weather at the time of the incident: fair skies, temperature in the mid-30s with easterly winds in the low 20 mph range with wind gusts ranging from 26-29 mph. The ground was dry. [Weather Underground].

INVESTIGATION

At an unknown date after the tree had been felled, the decedent and his son went to the site to trim some limbs and branches. While trimming, the tree shifted, and his son told his father not to go out alone to cut the tree. The tree had been down nearly one month and

Photo 3. Incident site, looking northwest. Note area of fresh dirt disturbance when supporting branch (identified by orange line) moved when tree rolled

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still was not cut up and removed. The decedent, due to his "get 'er done" nature, wanted to get the tree cut up and taken care of as planting was just a few months away (See Photo 1).

On the day of the incident, the decedent had breakfast and left the house around 10am while his wife was busy with another activity. He drove a gator to the incident site. He returned home around 10:30am. He attached his trailer containing his toolbox, water, Stihl chain saw (model unknown), splitter, and other equipment to the gator and drove back to the incident site. While at the incident site, the decedent wore coveralls, a hat, gloves, and work boots (appropriate for the temperature).

Photo 4. Incident scene looking north. Curved arrow shows direction of tree rotation, limb upon which tree was balanced.

When he did not return home for lunch, his wife called him. He did not answer and there was no voice mail, which was unusual. The phone just rang and rang. She went to investigate. Thinking he may have been in the cleared area on the west side of the field where tree processing was being performed, she got into her car and drove along the mowed path on the west side of the field. Upon arrival, she did not see him there.

Photo 5. Looking south. Orange dotted line shows limb supporting tree. Green dotted line shows another supporting branch which broke away from the tree when it rolled to the south.

She drove back home. She picked up her cell phone and then got into

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a pickup truck and drove along the east side field path across from the incident site. She honked the horn and yelled for him. He did not answer. She called her son (who was asleep having worked the previous night) asking him to come over to check on his father. His son tried to call him and, again there was no answer.

She placed the pickup truck in reverse and backed the truck to their home. She got dressed for the cold weather and then ran across the field to the location of the felled tree.

Photo 6. Close view of chainsaw location under limbs and branches removed when working from north side

Her son, who had driven his pickup truck to the site, arrived just before her and told her to keep away. He found the decedent unresponsive and pinned by a tree trunk laying on his right side, his feet to the north and head to the south, with his face facing east. Using the chain saw in the back of his truck, he cut away a section of the tree laying on top of the decedent and moved it away from him. He then called 911.

The incident was unwitnessed. Based on police photographs taken during their investigation, it is apparent, due to the fresh sawdust accummulation, that the decedent first started to remove branches from the north side (Photo 6).

MIFACE hypothosizes that the decedent had moved from the north side of the tree to the south side. Based on the quantity and location of fresh sawdust, he had just begun to remove branches from the limbs. The decedent may have attempted to cut a smaller limb that he believed would allow the elevated trunk to roll to the north.

Photo 7. Chainsaw blade near freshly cut limb

We hypothesize the primary trunk was above the location of the chain saw and that he was cutting branches that he believed would cause the tree to roll toward the north. When the cut began, the load release of the tree top cut in combination with hanging on the stump did not

allow the tree to roll to the north; rather, the a supporting tree branch on one of the raised limbs broke away from the large limb and the tree to rolled south. The moving tree caused pressure on "wedged" branch, which made the fresh dirt marks ward causing the fresh dig marks on the ground. (Photos 3, 4 and 5).

The decedent was unable to get out of the way of the tree movement and was pinned by the tree trunk. His chain saw was found by responding police under another large tree limb (Photos 6 and 7).

MIOSHA Citations

MIOSHA did not conduct a compliance investigation.

CAUSE OF DEATH

The death certificate listed the cause of death as multiple injuries. Post-mortem toxicology was negative for alcohol, illegal and prescription drugs.

CONTRIBUTING FACTORS

Occupational injuries and fatalities are often the result of one or more contributing factors or key events in a larger sequence of events that ultimately result in the injury or fatality. The following hazards were identified as key contributing factors in this incident:

- Inadequate hazard assessment of the hazards posed by the felled tree
  - Forest floor soil characteristics react differently than field hard packed soils
  - Forest edge trees react differently than in-forest trees
- Safe limbing and bucking work practices not followed
- Working alone

RECOMMENDATIONS/DISCUSSION

Recommendation #1: When felling and limbing trees, recognize differences in soil characteristics between "forest" trees and "fence line" trees.

Discussion: Ground impaled limbs have caused many of the issues regarding "fence line" cleaning. The impaled limbs tend to react differently on "ag soil" verses "forest soil" possibly due to hardpack soil horizons. When performing fence line cleaning, MIFACE encourages individuals to "backstop" trunk sections where there are impaled limbs to minimize tree movement. This could be done by appropriately chaining the tree to a tractor or supported by a loader, blocking, or perhaps backing the tractor up to the trunk from the cutting side.

Recommendation #2: Use safe work practices when performing limbing or bucking activities with a chainsaw including performing a hazard assessment, standing uphill when possible, not working alone and wearing appropriate personal protective equipment.

Discussion: The American National Standards Institute (ANSI) is a "private, not-for-profit organization dedicated to supporting the U.S. voluntary standards and conformity assessment system and strengthening its impact, both domestically and internationally". ANSI Z133-2017, *Arborists Safety Requirements,* provides safety criteria for both workers and the public who are involved in tree care operations such as pruning, trimming, repairing, maintaining, and removing trees. ANSI Z133-2017 contains 8 chapters:

- Chapter 1 - General Safety Requirements
- Chapter 2 - Normative References
- Chapter 3 - General Safety Requirements
- Chapter 4 - Electrical Hazards
- Chapter 5 - Safe Use of Vehicles, Mobile and Towed Equipment Used in Arboriculture
- Chapter 6 - Portable Power Hand Tools
- Chapter 7 - Hand Tools and Ladders
- Chapter 8 -Tree Climbing

Each Chapter contains sections that have specific work practice recommendations. For example, Chapter 3 – General Safety Requirements has a section on Personal Protective Equipment, Chapter 6 – Portable Power Hand Tools has a section on chain saws and Chapter 8 – Tree Climbing has a section on Limbing and Bucking addressing safe work practices during limbing and bucking activities.

ANSI Section 8.8.4 through Section 8.8.7 provides guidance on the work practices of the chainsaw operator while using the chain saw to limb/buck the tree. ANSI recommends:

- Chain saws should be operated away from the vicinity of the legs and feet. Natural barriers, such as limbs between the saw and the body, should be employed where possible. While operating a chain saw, the preferred working position is on the uphill side of the work.
- The worker shall ensure firm footing before and during limbing and bucking.
- The worker shall not stand on loose debris or logs that may roll when the log being bucked is cut. Trees, limbs, or saplings under tension shall be considered hazardous. Appropriate cutting techniques and precautions shall be followed.
- When necessary to prevent rolling, logs shall be blocked with wood or other suitable material.

The MIOSHA General Industry Safety and Health standard, Part 51, Logging establishes safety practices, means, methods, and operations for all types of logging, regardless of the end use of the wood that could be incorporated into the work practices by self-employed individuals. Included in Part 51 is guidance on chain saw use, personal protective equipment, working alone, and safe work practices for felling, limbing, bucking and skidding.

In the Additional Resources section below are resources for chain saw operators to learn more about safety practices when limbing and cutting, including several YouTube videos which describe forces on the wood to aid in hazard assessment and safe cutting techniques.

Recommendation #3: When working alone, establish a check-in procedure with another individual to help assure prompt emergency assistance.

Discussion: Agricultural workers, including farmers, regularly work alone on the farmstead. Therefore, it is important to establish an effective communication system for the individual who is working alone to contact other people who can provide emergency assistance.

The frequency of checking in to another individual should be appropriate based on the hazards to which the isolated worker is exposed. The check-in procedure can be initiated by a family member or the individual who is working alone

and should be established based upon what is practical for the worksite circumstances. In agricultural settings, the availability of cell phone coverage should be established if that is the means of communication selected.

MIOSHA's Logging Safety Standard, Part 51, Rule 5113 states that, among other requirements, that an employer may not permit an employee to work alone on felling or skidding operations. Part 51, Rule 5152 states that "a faller or bucker shall not work beyond hearing range of another employee unless a procedure has been established for periodically checking on the faller or bucker during the course of the work day." Written safe work procedures should include provisions for checking the wellbeing of every faller and bucker at the operation throughout the workday. Several options to check on isolated fallers and buckers are: (a) the "buddy" system, (b) communication checks via two-way radio or site inspection at least every 20-30 minutes.

Although it may not have prevented his death, a scheduled time to check in with someone when an individual is working alone could prevent an injury from becoming a fatality.

Recommendation #4: Do not remove a crushing weight from an individual prior to contacting emergency response and receiving their instructions.

Discussion: Instinct and a desire to save a person trapped under a crushing weight cause individual(s) to want to immediately remove the object from the person. However, the immediate removal of a crushing weight could lead to the death of the trapped person if the person has not received lifesaving medical treatment *prior* to the removal of the weight. MIFACE recommends that individual finding individuals trapped under crushing weight first call for emergency response and receive instruction prior to removing the weight from the person.

The immediate removal of the tree trunk from the decedent was not a factor in this incident because family members indicated that he was deceased upon arrival.

ADDITIONAL RESOURCES

- Logging Safety: A Field Guide, Section 4L Limbing and Bucking. New York State. https://www.health.ny.gov/publications/3132/logging_section_four.htm
- North American Training Solutions. https://northamericantrainingsolutions.com/standards/
- New Jersey FACE Report #12NJ078: Tree-care Worker is Crushed by Cut Tree Section During Storm Damage Cleanup https://www.cdc.gov/niosh/face/stateface/nj/12nj078.html
- OSHA Logging etool https://www.osha.gov/SLTC/etools/logging/index.html
    - Manual Operations: Limbing and Bucking https://www.osha.gov/SLTC/etools/logging/manual/limbing_bucking.html
- MIFACE Investigation Report #06MI066: Logger Killed When Struck By Lodged Tree That Fell
- MIFACE Investigation Report #11MI115: Farmer Run Over and Pinned by Tractor Tire

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REFERENCES

MIOSHA General Industry Safety Standard, Part 51 – Logging.

American National Standards Institute (ANSI) https://www.ansi.org/default

Weather Underground [2014]. Weather history for nearby weather station. The Weather Channel Interactive, Inc.

ACKNOWLEDGEMEMENT

The Michigan FACE Program would like to acknowledge the decedent's family members for providing assistance and information for this investigation.